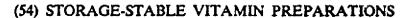
PATENT SPECIFICATION

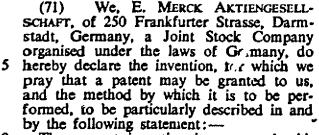
NO DRAWINGS

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The present invention is concerned with new, storage-stable vitamin compositions and

with the preparation thereof.

It is known that a loss of content folic acid, panthothenyl alcohol and panthothenic 5 acid and the salts thereof occurs in pharmaceutical compositions, especially in multivitamin compositions, during storage. Efforts to stabilise these vitamins with the help of galenical methods, for example, by the avoid-0 ance of concurrent granulation with other active materials, or by the addition of inert adjuvants, such as finely-divided silicic acid, have hitherto been unsuccessful.

We have now found that compositions 5 containing these vitamins can be prepared with a most surprising galenical stability when at least one member selected from folic acid, pantothenyl alcohol, pantothenic acid and the salts of pantothenic acid are 0 intimately mixed with galactomannans obtained fro guar endosperm flour or carob bean seed flour. The addition of further stabilisers is hereby rendered unnecessary.

The new compositions according to the 5 present invention additionally possess the considerable advantage that, in contradistinction to the previously known compositions, they can be ground without difficulty in conventional mills, such as pin mills and 0 hammer mills. The powders thereby obtained are homogeneous, finely-divided and readily sievable. A further remarkable advantage of the new compositions is their outstanding solubility in cold and warm water so that a 5 digestion or the liberation of the vitamins is ensured in all cases, not only in the case of physiological liberation in the body but also in the case of analytical investigations.

Consequently, according to one aspect of

the present invention, there is provided a 50 process for the preparation of storage-stable, solid compositions containing at least one member selected from folic acid, pantothenyl alcohol, pantothenic acid and the salts of pantothenic acid, which consists in that at 55 least one of these vitamins is intimately mixed with galactomannans obtained from guar endosperm flour or carob bean seed

According to another aspect of the present 60 invention, there are provided storage-stable, solid vitamin compositions comprising 0.1— 50 parts by weight of at least one of the said vitamins intimately mixed with 99.9---50 parts by weight of galactomannans obtained 65 from guar endosperm flour or carob bean seed flour.

The galactomannans are naturally-occurring hydrocolloids from the seeds of guar pods (Cyamopsis tetragonoloba) and from 70 the seeds of the pods of the carob bean tree (Ceratonia siliqua). According to the chemical structure thereof, they are polysaccharides which consist of a long main chain of mannose molecules with single-membered 75 side chains of galactose molecules. In the galactomannans obtained from guar endosperm flour, or a statistical average every second mannose unit bears a single-membered galactose side chain and in those obtained from carob bean seed flour, on average every fourth mannose unit bears a single-membered galactose side chain.

The galactomannans dissolve in water, possibly with warming. Even small concentrations can give highly viscous colloidal solutions.

The new compositions according to the present invention are prepared in the usual manner, preferably by evaporation of aqueous solutions which contain at least one of the said vitamins and the hydrocolloid. The evaporation to dryness expediently takes place under reduced pressure. The product obtained is comminuted, preferably by grinding, and possibly sieved. Of course, other drying processes can be used for the



removal of the water, especially the conventional spray-drying processes. The end product generally still contains EXAMPLE 3. 0.5—1.5% by weight of water. In accord-5 ance with requirements and intended use, the compositions according to the present Galactomannans invention contain 0.1-50 parts by weight of at least one of the vitamins selected from the group consisting of folic acid, panto-10 thenyl alcohol, pantothenic acid and the salts of pantothenic acid and 99.9-50 parts by EXAMPLE 4. weight of galactomannans obtained from Folic acid guar endosperm flour and/or carob bean Galactomannans seed flour. The multi-vitamin compositions according to the present invention preferably contain about 33.3 parts by weight of vitamin or vitamins and about 66.6 parts by weight of galactomannans. or by vacuum drying. The new compositions according to the 20 present invention have a very good storage Example 5. stability and, even in the case of storing for a comparatively long period of time, at different, even elevated temperatures, are more potato starch stable than compositions which have been prepared without the intimate mixing accellulose powder cording to the present invention. The compositions according to the prelactose sent invention can, because of the physio-logical compatability of the naturally-occur-ring hydrocolloids, be used not only as pharmaceuticals but also in the field of foodstuffs. Thus, they are suitable for use in pharmaceuticals or for the vitaminisation of foodstuffs and animal feeds and especially 35 for the production of dielectric nutrients. In principle, the new compositions can be used wherever an addition of one or more of the EXAMPLE 6. said vitamins is desired. The following Examples are given for the purpose of illustrating the present invention: Example 1: 1 1 1 1 1 1 1 1 Orotic acid Pantothenyl alcohol 3.33 kg Galactomannans ad 10.00 kg. Folic acid/ 6.66 kg. of a galactomannan from guar 45 endosperm flour or from carob bean seed Riboflavin flour are completely swollen up in about 100 Cyanocobalamine litres water. To this solution is added the Maize starch pantothenyl alcohol, diluted with water, and Lactose the mixture obtained is then dried by spray-50 ing into a spraying tower with an inlet temperature of 180°C, and an exit temperature of 80°C. The fine, spheroidal product obtained has a particle size of mainly 100 μ . EXAMPLE 2. 0.33 kg. Calcium pantothenate .,... Galactomannans, ... ad 10.00 kg.

The galactomannan is swollen in 50 litres

water, mixed with the calcium pantothenate,

dissolved in water, and dried on trays in a 60 vacuum drier at 40°C. The product obtained

can be ground and reduced to any desired

particle size in any type of suitable mill, such as a pin mill or a hammer mill. 65 $0.033 \, \text{kg}$ Sodium pantothenate 10.000 kg. نع The intimate mixing is carried out in the manner described in Example 1 or 2. 70 10.00 kg. ad The folic acid, in undissolved form, is stirred into the swollen galactomannans. The end product is obtained either by spraying Pantothenyl alcohol/ 21.0 mg. galactomannans 331% 22.0 mg. 13.0 mg. finely-divided silicic acid 80 27.0 mg. 5.0 mg. magnesium stearate ad 450.0 mg. The pantothenyl alcohol/galactomannan composition is prepared in the manner described in Example 1. The individual components listed above are sieved and pressed into a tablet of 11 mm. diameter. Even after storage for several months, no loss of pantothenyl alcohol content can be detected. Thiamine phosphoric acid. 3.0 mg. ester phosphate salt Calcium pantothenate/ 95 galactomannans 331% 15.0 mg 10.0 mg. 5.0 mg. Tocopherol succinate 3.0 mg. Pyridoxal hydrochloride 100 galactomannans 50% 2.0 mg. 3.0 mg. 5.0 Y 15.0 mg. 15.0 mg. Finely-divided silicic acid 3.0 mg. 105 Magnesium stearate ac 250.0 mg.

The calcium pantothenate/galactomannan composition is prepared in a manner analogous to that described in Example 2 and the folic acid/galactomannan composition in a 110 manner analogous to that described in Example 4. The individual components listed above are sieved in the usual manner, mixed, granulated and pressed into tablets, each weighing 250.0 mg. and having a diameter 115 of 9 mm. Even after storage for several months, no loss of calcium pantothenate content can be detected.

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	Example 7.		
	Riboflavin	4.0	mg.
	Pyridoxal hydrochloride	4.0	mg.
_	Thiamine mononitrate	5.0	mg.
5	Nicotinamide	15.0	mg.
	Pantothenyl alcohol/		-
	galactomannan 331%	9.9	mg.
	Orotic acid	25.0	mg.
	Tocopherol acetate	5.0	mg.
10	Finely-divided silicic acid	7.5	mg.
	Biotin	0.1	mg.
	Thioctic acid	5.0	mg.
	Cyanocobalamine	8.0	
٠,٠	Magnesium stearate	2.5	mg.
15	Carboxymethyl cellulose	2.5	mg.
	Lactose ad. 2	250.0	mg.

The pantothenyl alcohol/galactomannan composition is prepared in the manner described in Example 1. From the above-mentioned components, there is prepared a dragee core with the weight of 250 mg. and 9 mm. diameter. Cores prepared in this manner are then drageed in the usual manner with sugar, flour, titanium dioxide and tale to give dragees with a weight of 425 mg. The stability of the pantothenyl alcohol compositions was confirmed by storage experiments.

WHAT WE CLAIM IS:-

Storage-stable, solid vitamin compositions, comprising 0.1—50 parts by weight of at least one vitamin selected from folic acid, pantothenyl alcohol, pantothenic acid and the salts of pantothenic acid intimately mixed with 99.9—50 parts by weight of galactomannans obtained from guar endosperm flour and/or carob been seed flour.

2. Compositions according to claim 1, which contain about 33.3 parts by weight of the vitamin or vitamins and about 66.6 parts by weight of the galactomannans.

3. Compositions according to claim !, substantially as hereinbefore described and exemplified.

4. Process for the preparation of storagestable, solid vitamin compositions, wherein 0.1—50 parts by weight of at least one vitamin selected from folic acid, pantothenyl alcohol, pantothenic acid and the saits of pantothenic acid are intimately mixed with 50

pantothenic acid are intimately mixed with 50 99.9—50 parts by weight of galactomannans obtained from guar endosperm flour and/or carob bean seed flour.

5. Process according to claim 4, wherein about 33.3 parts by weight of the vitamin or vitamins are intimately mixed with about 66.6 parts by weight of galactomannans.

6. Process according to claim 4 or 5, wherein the components are combined in water, with good mixing up, and the water subsequently removed.

7. Process according to claim 6, wherein the water is removed by evaporation under reduced pressure or by a spray drying process

8. Process according to claim 4 for the preparation of storage-stable, solid vitamin compositions, substantially as hereinbefore described and exemplified.

9. Storage-stable, solid vitamin preparations, whenever prepared by the process according to any of claims 4—8.

10. Multivitamin compositions, whenever containing a composition according to any of claims 1—3 and 9.

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